



EMERGING TECHNOLOGIES REPORT

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1. Recent Emerging Technologies

1.1 What defines an emerging technology?

There is much debate regarding the criteria for what is to be considered an emerging technology. According to BusinessDictionary.com, an emerging technology is considered a new technology that is currently being developed or is to be developed in the next five to ten years (BusinessDictionary.com, n.d.). Generally, most emerging technologies are new, but this can also include older technologies that are still relatively undeveloped.

Emerging technologies are developed with the intention of changing and improving many fundamental tasks and interactions including how we work, travel and communicate with each other (Department of Industry, n.d.). Businesses also leverage the opportunities posed by these technical innovations strategically, for the purpose of competitive advantage.

Every company and industry are affected differently by emerging technologies, but experts from PricewaterhouseCoopers believe that artificial intelligence, robotics, virtual and augmented reality, internet of things and blockchain technology are among the innovations that will have the most significant global impact across industries (PricewaterhouseCoopers, 2017).

1.2 Internet of Things

The Internet of thing (IoT) is a system of interconnected devices embedded in everyday objects with the aim of interaction, connectivity and data sharing, usually without the need for human intervention. This involves extending internet connectivity beyond standard devices such as laptops, smartphones and tablets, to other physical devices that are non-internet enabled or traditionally considered to be 'dumb'.

The fact that there is wide range of applications for IoT technology can mean that specifics can be very different from one device to the next, however there are fundamental characteristics shared by most. Connectivity, sensors, processors, energy-efficiency, cost-effectiveness, quality and reliability and security are the main attributes that help define the products apart of the IoT ecosystem.

There are countless use cases where IoT can be deployed. The extensive use of applications for IoT devices include consumer applications such as smart home automation to commercial and industrial applications including for medical and health related purposes recognized as the Internet of Medical Things (IoMT). Businesses and consumers alike can utilize the internet of things and associated devices to efficiently carry out everyday tasks, save time and money as well as gaining further insight and knowledge to the world around them, much more so than is possible without IoT.

Despite the advantages posed by the internet of things, there are many adoption barriers, criticisms and controversies surrounding such a concept. One of the biggest obstacles is the security of IoT devices, with concern that products are being developed without proper consideration for the implementation of security measures and encryption. The lack of an industry standard framework for security as well as

device manufacturers looking to capitalize on demand means that these businesses are overlooking these flaws and not prioritizing security during a product's design phase. Other issues include privacy and autonomy, platform fragmentation and device compatibility.

Though we are still trying to comprehend the opportunities and challenges that are presented by the internet of things, there must be continued research regarding the implications and benefits associated with the technology and the potential impact it can have on the way we work and live.

1.3 Augmented Reality

Augmented reality (AR) is the integration of digital information within the user's environment displayed in real time. Unlike virtual reality which creates a totally artificial environment, AR uses the existing environment and overlays new information such as sounds, images and text on top of it (Rouse, 2016). As both virtual and real worlds harmoniously coexist, users of augmented reality experience a new and improved natural world where virtual information is used as a tool to aid in everyday activities (Rolle, 2018).

Augmented reality relies on a variety of technological innovations including general hardware components such as the processor, display, sensors and input devices to achieve its functionality. Modern mobile computing devices like a smartphone as well as other systems capable of displaying AR data such as optical projection systems, head-mounted displays, smart glasses and contact lenses contain elements including a camera, accelerometers, GPS and solid-state compasses, thus making them suitable platforms for AR.

A lot of the focus around augmented reality at present is developing software to complement and take advantage of these hardware capabilities. The Augmented Reality Markup Language (ARML) data standard is being used to standardize XML grammar for AR, while several software development kits (SDK) and toolkits such as ARCore from Google and ARKit from Apple are being designed to simplify AR development.

Augmented reality has been explored in several sectors from gaming and entertainment with the popular Pokémon Go mobile game to other markets such as medical training, retail, public safety and much more. As the technology progresses, businesses have been increasingly interested in utilising AR to drive their marketing strategy, customer engagement and sales. This interest will continue as innovators continue to explore the relevance and roles that AR can have in the workplace, giving much promise for it to revolutionize the way businesses operate.

As with any emerging technology, there are some challenges and limitations to overcome before we see mainstream adoption. Being able to recognize risks to consumer security, privacy and safety is the first step to resolving long-term vulnerabilities that augmented reality can create. What sets AR apart from other technology is its immersive nature. Allowing technology to directly mediate a person's perspective of and interaction with the physical world presents exciting opportunities, but it also makes safety concerns much more pressing compared with issues raised by more traditional technologies such as phones or laptops, which don't directly affect our view of reality.

Despite these apprehensions, the future of AR could lead to massive improvements in productivity in the workplace, and quality of life in the social space. Augmented reality is developing very fast and with more and more people working on it, and many billion-dollar companies investing in it, it's safe to say it's set to have a big impact across industries.

2 New Ideas & Applications

2.1 Problem

Drowning is a major public health problem worldwide. It is the third leading cause of unintentional injury death worldwide, accounting for 7% of all injury-related deaths (World Health Organization, 2018). An estimated 360,000 people die every year around the world from drowning.

A case study done by Royal Life Saving Society Australia (Royal Life Saving Society Australia, 2018) shows that 249 people drowned in Australian waterways alone between 1 July 2017 and 30 June 2018. These statistics do show that there is a 14% reduction on 2016/17 statistics and an 11% reduction in deaths on the ten-year average. Other than the methods currently in place to prevent such incidents, we can reduce the amount of deaths with the adoption of technology to avoid these accidents and further educate people on the risks before entering the water.

2.2 Solution

SwimSafe is our attempt at providing a solution to this important global issue. Fundamentally, SwimSafe is a mobile application for Android and iOS that utilizes augmented reality to give a visual representation of strong rip currents, shallow sandbars and other potential dangers at Australian beaches.

Our main aim with SwimSafe is to assist with teaching people how to identify hazards that would usually be difficult to spot without our application. Employing GPS technology to first identify the location of the user, the phone's camera can then be used to scan the waterline and will overlay a digital marker on the user's screen to flag a danger. Surf lifesavers and life guards will be capable of setting these markers with a description on the risks involved.

Other than Australian beaches, we are aware that there is a difficulty being able to accommodate for waterways that are not commonly patrolled such as rivers, creeks and streams which also have a high mortality rate due to drowning. To combat this, we will alternatively provide detailed information through our application on what to look out for and are looking at the possibility of moderated user uploaded markers for these locations.

Despite these surmountable limitations, our application has many strengths and can have a serious, positive impact and lasting effect on water safety. In partnership with organizations such as Royal Life Saving Society Australia and Surf Life Saving Australia as well as investment from government ran initiatives, our ultimate objective is to see our product assist in decreasing the number of deaths caused by drowning.

3 References

- Adcock, M. (2018, January 12). *It's time to get ready for augmented reality*. Retrieved April 14, 2019, from The Conversation: <http://theconversation.com/its-time-to-get-ready-for-augmented-reality-89760>
- Banister, C., & Hertel, A. (2018, May 06). *We love augmented reality, but let's fix things that could become big problems*. Retrieved April 14, 2019, from TechCrunch: <https://techcrunch.com/2018/05/06/we-love-augmented-reality-but-lets-fix-things-that-could-become-big-problems/>
- BusinessDictionary.com. (n.d.). *What are emerging technologies?* Retrieved April 02, 2019, from BusinessDictionary: <http://www.businessdictionary.com/definition/emerging-technologies.html>
- Department of Industry, I. a. (n.d.). *Understanding emerging technologies*. Retrieved April 02, 2019, from Department of Industry, Innovation and Science: <https://www.industry.gov.au/data-and-publications/australias-tech-future/introduction/understanding-emerging-technologies>
- Hughes, B. (2017, February 28). *The internet of things: an overview*. Retrieved April 02, 2019, from ComputerWeekly.com: <https://www.computerweekly.com/opinion/The-internet-of-things-an-overview>
- Islam, A. (2018, December 11). *The Future of Augmented Reality*. Retrieved April 14, 2019, from Medium: <https://medium.com/predict/the-future-of-augmented-reality-90143b98f7a3>
- Marr, B. (2018, July 30). *9 Powerful Real-World Applications Of Augmented Reality (AR) Today*. Retrieved April 14, 2019, from Forbes: <https://www.forbes.com/sites/bernardmarr/2018/07/30/9-powerful-real-world-applications-of-augmented-reality-ar-today/>
- Morgan, J. (2014, May 13). *A Simple Explanation Of 'The Internet Of Things'*. Retrieved April 14, 2019, from Forbes: <https://www.forbes.com/sites/jacobmorgan/2014/05/13/simple-explanation-internet-things-that-anyone-can-understand/>
- NdimensionZ. (2017, July 20). *Internet of Things (IoT) – Possible Limitations*. Retrieved April 14, 2019, from NdimensionZ: <http://ndimensionz.com/kb/internet-of-things-iot-possible-limitations/>
- Oldham, P. (2018, July 03). *5 Best Augmented Reality Use Cases*. Retrieved April 14, 2019, from business.com: <https://www.business.com/articles/best-augmented-reality-uses/>
- Paine, J. (2018, May 30). *10 Real Use Cases for Augmented Reality*. Retrieved April 14, 2019, from Inc.com: <https://www.inc.com/james-paine/10-real-use-cases-for-augmented-reality.html>
- PricewaterhouseCoopers. (2017). *The Essential Eight technologies*. Retrieved April 14, 2019, from PwC: <https://www.pwc.com/gx/en/issues/technology/essential-eight-technologies.html>
- Reality Technologies. (2018). *What is Augmented Reality (AR)? Ultimate Guide to Augmented Reality (AR) Technology*. Retrieved April 14, 2019, from Reality Technologies: <https://www.realitytechnologies.com/augmented-reality/>
- Robinson, C. (2010, August 08). *Augmented Reality*. Retrieved April 14, 2019, from <http://aboutaugmentedreality.blogspot.com/>

- Roesner, F. (2017, October 19). *Who Is Thinking About Security and Privacy for Augmented Reality?* Retrieved April 14, 2019, from MIT Technology Review: <https://www.technologyreview.com/s/609143/who-is-thinking-about-security-and-privacy-for-augmented-reality/>
- Rolle, A. (2018, November 22). *Making digital work real*. Retrieved April 14, 2019, from Medium: <https://medium.com/datadriveninvestor/making-digital-work-real-7f5cc4b41fc0>
- Rouse, M. (2016, February 22). *What is augmented reality (AR)?* Retrieved May 04, 2019, from WhatIs.com: <https://whatis.techtarget.com/definition/augmented-reality-AR>
- Royal Life Saving Society Australia. (2018). *Royal Life Saving National Drowning Report 2018*. Sydney: Royal Life Saving Society – Australia 2018. Retrieved April 14, 2019, from https://www.royallifesaving.com.au/__data/assets/pdf_file/0004/23197/RLS_NDR2018_Report_LR.pdf
- Sense of Security. (2018, June 14). *IoT: The Security Risks*. Retrieved April 14, 2019, from <https://www.senseofsecurity.com.au/iot-security>
- Surf Life Saving Australia. (2018, September 11). *National Coastal Safety Report 2018*. Retrieved April 14, 2019, from issuu: <https://issuu.com/surflifesavingaustralia/docs/ncsr-2018>
- World Health Organization. (2018, January 15). *Drowning*. Retrieved April 14, 2019, from World Health Organization: <https://www.who.int/news-room/fact-sheets/detail/drowning>